

## CLAIMS

What is claimed is:

1. A sensing element for use with a controller adapted to receive input signals corresponding to the sensing element, said sensing element comprising:
  - a housing defining a conduit adapted to be in fluid communication with a fluid;
  - a pair of sensing arrays disposed within said conduit, said pair of sensing arrays being in a facing spaced relationship to define a gap disposed therebetween;
  - a plurality of sensors disposed on said pair of sensing arrays, said plurality of sensors being adapted to sense and provide signals corresponding to a plurality of parameters of said fluid;
  - a microprocessor adapted to receive the signals of said plurality of sensors, said microprocessor being adapted to determine at least one condition of said fluid upon receipt of the signals corresponding to the plurality of parameters of said fluid.
2. The sensing element as in claim 1, wherein the controller is an engine control module for an engine of a vehicle.
3. The sensing element as in claim 2, wherein the housing is adapted to be secured to a fluid conduit of the vehicle.
- 25 4. The sensing element as in claim 3, wherein the fluid conduit is a fuel line.

5. The sensing element as in claim 1, wherein the microprocessor is secured to the exterior of the housing and said microprocessor is encased in a sealing means.
6. The sensing element as in claim 1, wherein the microprocessor is adapted to  
5 be in communication with the controller for signal transfer therebetween.
7. The sensing element as in claim 1, wherein the microprocessor is secured to the exterior of the housing and said microprocessor is encased in a sealing means.
- 10 8. The sensing element as in claim 1, wherein the controller is an engine control module for an engine of a vehicle and the microprocessor is secured to the exterior of the housing, said microprocessor being encased in a sealing means and said microprocessor is adapted to be in communication with the engine control module for signal transfer therebetween.
- 15 9. The sensing element as in claim 8, wherein the engine control module is adapted to be in communication with a dashboard display of the vehicle for signal transfer therebetween.
- 20 10. The sensing element as in claim 1, wherein the plurality of parameters include temperature, pressure differential exerted on the sensor array and force exerted on the sensor array.
11. The sensing element as in claim 10, wherein the arrays are wing shaped.
- 25 12. The sensing element as in claim 11, wherein at least one of the sensors is disposed on the leading edge of one of the arrays.

13. The sensing element as in claim 11, wherein the arrays are stainless steel.
14. The sensing element as in claim 10, wherein the pressure differential signal is used by the microprocessor to determine the flow rate of said fluid flowing through said housing.  
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15. The sensing element as in claim 14, wherein the pressure differential signal of one array is used by the microprocessor to determine the flow rate of said fluid flowing through said housing and the pressure differential signal of the other array is used by the microprocessor to check the flow rate determined by the microprocessor.  
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16. The sensing element as in claim 1, wherein the pair of sensing arrays and the plurality of sensors are adapted to provide signals to the microprocessor  
15 wherein the microprocessor is adapted to determine the dielectric constant of the fluid flowing between the pair of sensing arrays.
17. The sensing element as in claim 1, wherein the configuration of the pair of sensing arrays and the cross sectional area of the housing are predetermined and  
20 stored within the memory of the microprocessor.
18. The sensing element as in claim 1, wherein the pair of sensing arrays and the plurality of sensors are adapted to provide signals to the microprocessor wherein the microprocessor is adapted to determine the conductivity of the fluid  
25 flowing between the pair of sensing arrays.
19. The sensing element as in claim 1, wherein one of the plurality of sensors is disposed within one of the pair of sensing arrays.